THE CHOICE OF A METHOD OF SURGICAL DELIVERY AT OR NEAR FULL TERM *

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For many centuries, when the necessity arose for artificial termination of pregnancy during the last months, the only recourse was the so-called "classic" Caesarean section. More recently accouchement forcé and symphysiotomy were added to the resources of obstetricians. In our era of asepsis and development of refinements of surgical technique, various modifications of these methods have been evolved; for example: (1) vaginal hysterotomy was developed as an improvement over the more dangerous method of rapid cervical dilatation; (2) pubiotomy has replaced symphysiotomy; (3) Caesarean section was modified by making the incision in the fundus of the uterus, either vertically or transversely; and (4) suprapubic, extraperitoneal methods of hysterotomy were designed to avoid making a direct opening from the peritoneal cavity into the possibly infected uterine cavity; so that today, when confronted with the problem of surgical delivery, it is necessary to choose one of a number of possible methods. For each of these some definite ideas as to indications and contraindications under different conditions must be formulated.

Without reviewing the evolution of the various procedures which have led up to the methods now commonly employed, as has been done in such thorough and masterly fashion by Nicholson, and leaving out of consideration forceps operations, version and dilatation of the cervix, either manually or instrumentally, our attention will be confined to the cutting operations.

As the truly extraperitoneal methods of suprapubic hysterotomy have not been found to yield advantages commensurate with the technical difficulties of the operation, they have been practically abandoned in favor of the low, transperitoneal incision through the cervical zone of the uterus, which gives all of the real advantages of the extraperitoneal operation without its difficulties. Also, experience has shown that the fundal incisions are more prone to rupture than the median vertical incisions lower down in the uterus, so that in the present state of opinion, practically speaking, one's choice of a method of surgical delivery narrows down to one of five; namely, (1) vaginal hysterotomy (vaginal Caesarean section), (2) the low-incision-transperitoneal hysterotomy, called by De Lee laparo-trachelotomy, (3) the classic Caesarean section, in which the incision is a median vertical one in the anterior surface of the body of the uterus, (4) the Porro-Caesarean, in which hysterectomy is done, and (5) pubiotomy.

In determining the best operation to employ in any given case, the degree of danger to the life of the child, as well as to that of the mother, must be given due consideration; one should also gain as accurate as possible an estimate of the size of the child and of the capacity of the pelvis, and when there is a disproportion so pronounced that delivery through the vagina would entail much risk of injury to the child or of extensive laceration of maternal soft parts, delivery through the abdomen is preferable when possible.

The conditions which may demand surgical delivery are:

1. Those in which there is interference with engagement and outward passage of the child, such as contractions and deformities of the pelvis, maternal tumors, abnormalities in size, shape, and presentation of the fetal parts.
2. Those in which the lives of the mother and fetus are endangered by hemorrhage or toxemia, as in the eclamptogenic toxemia of pregnancy, placenta previa, and premature detachment of the normally situated placenta.

In this discussion it is assumed that the child is alive and presumably viable. If not alive it would, as a rule, be delivered through the vagina and in many cases it would be advisable that this be preceded by craniotomy.

Each of the five procedures from which one may be required to make a choice of an operation has its peculiar advantages and disadvantages under varying conditions, and it will be our endeavor to discuss some considerations which may influence the surgeon's judgment in his election of a method under various circumstances.

In any condition in which immediate delivery is urgent prior to six weeks from term, when forceps or version cannot be employed on account of an impervious cervix, vaginal Caesarean section is the operation to be chosen, except in a patient with marked pelvic obstruction or where there are abnormalities of the child, greatly increasing its bulk. Under the conditions here given it should practically always be possible, by means of vaginal hysterotomy, to effect delivery through the natural passages without serious injury either to the mother or the child. One may resort to vaginal hysterotomy even at full term when, for any reason, abdominal delivery is not possible.

Vaginal hysterotomy has the advantage of avoiding an abdominal incision, the danger of opening the peritoneal cavity and whatever risk there may be from rupture of the uterine scar in a subsequent pregnancy. It has the disadvantage that it sometimes presents technical difficulties, and when the child is proportionately large it may entail serious damage to the child or to the maternal tissues.

The classic Caesarean section affords an easier and more rapid method of delivery than does cervical hysterotomy, either suprapubic or vaginal, but in it the incision is made through the body of the uterus, and when this incision is closed, even with the greatest care and according to the most approved technique, the resulting scar may be the site of rupture of the uterus in a future pregnancy. It is difficult, if not impossible, to determine with accuracy the frequency of this accident. Rongy's estimate of approximately 3 per cent of ruptures in pregnancies, following classic Caesarean, seems conservative. To Spalding "the conclusion seems justifiable that 10 per cent of Caesarean-section scars are defective." No case, in which the mem-

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branes are ruptured and in which there is known or suspected infection, is suitable for the classic Caesarean operation. Other unfavorable features of the classic Caesarean are that it is apt to permit soiling of the peritoneum with liquor amii, and it is quite frequently followed by adhesions between the uterine scar and the intestines, omentum, or the uterine wall. Moreover, the rhythmic contractions and involution of the uterus tend to render slack the sutures in the uterine wound, preventing its uninterrupted healing. Extreme obesity and complete placenta previa are almost the only conditions which indicate the employment of classic Caesarean.

The low-incision, transperitoneal hysterotomy, in which the opening in the uterus is confined to the cervix and lower, non-contractile zone of the uterus, combines many of the advantages of both the classic and vaginal Caesarean sections, and lacks many of their objectionable features. This operation, by making use of peritoneal flaps, which are reflected downward and upward from near the vesico-uterine sulcus and sewed to the edges of the parietal peritoneum, effectively isolates the area of operation from the peritoneal cavity, and when suturing of the uterine incision is completed the peritoneal flaps are detached from the parietal peritoneum, overlapped, and sutured at right angles to the direction of the uterine wound, thus effectually minimizing the danger of involvement of the peritoneal cavity in case the uterine wound proves to be infected. The risk of rupture in future pregnancies is almost, if not completely, eliminated; for, although the operation has now been employed extensively, only two cases of rupture in a later pregnancy have been reported.

The prevalent idea that it is an operation difficult to perform is probably due to trouble encountered in the extraperitoneal operations in which the peritoneum was dissected intact from the bladder in order to gain approach to the uterus, instead of exposing the uterus through a transperitoneal incision.

The merits of this operation, as set forth by Beck in 1919 and since by De Lee, have been recognized for some years by obstetricians, many of whom employ it almost to the complete exclusion of the classic Caesarean section, although the latter seems not to have lost favor with the general surgeons.

Though it is generally conceded that the classic Caesarean gives a low mortality for both mother and child when done in clean cases, it is also well known that when the patient has been subjected to repeated vaginal examination or examined without proper antiseptic precautions, especially when the membranes are ruptured, it is attended with grave danger of peritonitis, so that its field of usefulness is restricted by the fact that a large proportion of cases in which abdominal delivery is required have been presumably contaminated.

When the incision is made low down in the non-contractile portion of the uterus and covered by a double layer of peritoneum, the danger of peritonitis is much diminished.

Two recent articles in the Journal of the American Medical Association by De Lee and Cornell, and by King, respectively, should go far toward establishing the low, transperitoneal operation as the superior method of abdominal delivery except in rare circumstances. De Lee and Cornell report 145 cases operated upon by this method, with only one death, from eclampsia and obesity. "None of the babies died; two were dead before entry to the hospital—both from abruptio placentae."

"Many of these women had been in labor hours and days, with the bag of waters ruptured and had had vaginal examinations made; three had forceps attempts, and many were poor risks." De Lee attributes his good results to the fact that the incision was made in the lower uterine segment. He states: "There are only two cases on record of actual rupture of the scar in a later labor."

King, in his article on "The End-Results of Abdominal Caesarean Section," in discussing rupture of the uterus, says: "The frequency of this accident has been variously estimated. In our series of seventy-eight patients in whom subsequent pregnancy was possible, only twenty-three could be traced, in whom twenty-three full-term pregnancies occurred; the scar ruptured in two of these cases. Findley concludes that not more than 2 per cent of ruptures occur in subsequent labors," but gives no figures to support his contention. Holland collected statistics from twenty-six hospitals and surgeons in England, with the following results: total number of cases, 1605; followed up, 1103; no subsequent pregnancy, 613; subsequent pregnancy, 487. Outcome of the pregnancies: (1) normal delivery, 78; (2) repeated Caesarean section, 352; (3) aborted, 47; (4) patients pregnant when heard from, 86; (5) ruptured scar, 18."

"Adding 1, 2, and 5 he gets a total of 448 pregnancies at or near term, with eighteen ruptures, or an incidence of 4 per cent. But Holland apparently failed to note that 352 of these were delivered by Caesarean section. Some of them may have had the test of labor and hence a test of the scar, but this point is not mentioned. Eliminating these 352, we have ninety-six patients who were allowed to test out the cicatrix, with eighteen ruptures, or 18.75 per cent. Similarly, Gamble, in a study of sixty-three pregnancies occurring in fifty-one women previously subjected to Caesarean section, reports one ruptured scar, an incidence of 1.5 per cent. But only seventeen of these cases terminated in vaginal delivery; the other forty-five patients were again delivered by Caesarean section. Hence, the corrected figure would be one rupture out of eighteen tests of labor, or 5.5 per cent. This percentage is lower than the one obtained from Holland's larger series; but we must bear in mind that Gamble's report is based on the work of a single well-organized clinic. Holland's figures, covering the work of twenty-six different hospitals and surgeons, certainly presents a more accurate picture of the results to be expected in average hands, and serve to emphasize the fact that subsequent rupture is a real menace."

The Porro-Caesarean operation is indicated in badly infected cases, as an emergency operation to

control alarming hemorrhage from the uterus, and is often employed to avoid the repetition of pregnancy.

Pubiotomy has a field of usefulness in certain cases of moderate contraction of the pelvis, in which it is desired to permanently enlarge the diameters of the pelvis.

The following cases from the writer's personal experience illustrate some of the problems demanding a choice of method of surgical delivery:

Case 1—A twenty-year-old primpara, who had not previously had medical care in her pregnancy, was seized with a hard convulsion on getting out of bed in the morning. Before I saw her she had a second convulsion. Taken to the hospital, she had a third convulsion before preparations for delivery were made. She was five weeks from full term. She was not in labor and the cervix was long and rigid. Her husband had lost his first wife and a sister following Caesarean sections and would not consent to abdominal delivery in this case. As the convulsions had not been controlled by narcotics, it was thought best to deliver immediately and as it was impossible to manually dilate the cervix, the husband s refusal of consent to abdominal delivery left no alternative to vaginal Caesarean section, which was done. Delivery was partially effected by version, but extraction of the head was completed by forceps. This was my first vaginal Caesarean and I omitted to do an episiotomy. There were deep lacerations in both anterior and posterior vaginal walls, but these were placed in good apposition by sutures and the ultimate result was excellent. The child died after breathing one hour. Less than a year later I delivered this woman of a vigorous eight and a half pound boy after a normal pregnancy and labor.

Case 2—A twenty-six-year-old primipara was under my close observation from the fourth month of pregnancy and all went well until, in the ninth month, she disregarded instructions as to diet and indulged freely in pork. This was soon followed by slight rise in blood pressure and later by high blood pressure (188), swelling of limbs and headache. When the latter symptoms appeared she was taken to the hospital and an attempt was made to induce labor by insertion of bougies into the uterus and giving castor oil and quinine by mouth and glycerin by enema. Twelve hours later painless uterine contractions were beginning, but they had continued only a few hours when the patient without warning had a severe convulsion. Within an hour she was on the operating table. The choice of a method of delivery lay between the low, transperitoneal hysterotomy and vaginal hysterotomy. Although the pregnancy was only one month from term, vaginal hysterotomy was chosen, on account of the fact that bougies had been in the uterine cavity since the previous day and it was felt that this involved a slight liability to infection. After making a lateral episiotomy the undilated and rigid cervix was incised anteriorly for a sufficient distance to permit the passage of the head, and delivery was then effected by forceps. The child thrived and the mother's wounds healed with good approximation.

Although the result was good from vaginal hysterotomy in this case, I am of the opinion that the employment of low, suprapubic Caesarean would not have been bad judgment.

Case 3—This case, which is here sketched in brief outline, was reported in full in the American Journal of Obstetrics and Gynecology. She was a primipara thirty-five years of age. I first saw her after she had been in labor over twenty-four hours. The membranes had ruptured, but the external os was only two centimeters in diameter. At the first examination my impression was that we were dealing with a case of hydrocephalus. She was taken to the hospital and after continuing in labor there for twelve hours the os was dilated only to the size of a dollar. Dilatation of the cervix was then manually completed, a hand was passed into the uterus and felt what seemed clearly to be a hydrocephalus. This was punctured with sharp scissors and a large amount of limpid fluid escaped. The collapsed, hair-covered sac then descended into the vagina and a portion passed outside of the vulval orifice. Strong traction on this failed to bring the head down and forceps were twice applied, but slipped off. Feeling satisfied that the obstacle to delivery had been removed by puncture of a hydrocephalus, the patient was returned to her bed, with the expectation that the child would be expelled on resumption of labor. But even after some hours of terrific pains there was no progress and it was then decided to terminate the labor.

In deliberating upon the choice of a method of delivery, vaginal Caesarean section, craniotomy and decapitation were rejected on account of the high position of the cervix, the inaccessibility of the head, the apparently large size of the child, the smallness of the vagina and the unusually firm, resistant perineum.

Low incision, transperitoneal abdominal hysterotomy was chosen as the most suitable procedure. On making a vertical incision through the anterior surface of the cervix and lower uterine segment, there escaped from the uterine cavity gas and yellow meconium, which was sponged away. The head, which lay in right occipito-posterior position, was easily delivered, followed by the collapsed sac, which was now for the first time seen to be, not a hydrocephalus, but an enormous meningocele springing from the occiput and nape of the neck.

Although pituitrin and erogotol were given by needle at the beginning of the operation the uterus failed to contract and there was a gush of blood from the uterine cavity, which was not controlled by packing and necessitated supravaginal hysterectomy.

Convalescene was complicated by signs of pneumonia of short duration and wound infection, but the patient was out of bed on the twenty-seventh day and eventually got a strongly healed wound and soon afterwards resumed her usual mode of living, and was in good health.

Case 4—A primipara, twenty-five years old, about three weeks from term, under the care of another physician, had one slight and one severe convulsion before I saw her. There was a third convulsion before she was gotten to the hospital. She was not in labor and the cervix was not dilated. A vigorous boy was delivered by low-incision, suprapubic hysterotomy. She had eight severe convulsions after delivery and for twelve hours was wildly maniacal, constantly tossing about. The inner sutures of the wound were torn out and the wound was later resutured and healed without infection. She made a good convalescence and the baby thrived.

Case 5—A primipara of twenty-one years. Although her pelvic measurements were normal, the vagina was uncommonly small. She was in labor nearly forty-eight hours without engagement of the head, which lay in R. O. P. position. As she was becoming exhausted by the long efforts at delivery, it was thought best to terminate the labor. Vaginal delivery could not have been effected without considerable danger to the mother's soft parts and great danger to the life of the child, so it was decided to deliver by a low, suprapubic Caesarean. This was done in the usual manner, with excellent results for both mother and baby.

The cause of the dystocia in this case was unusual and interesting. The parietal bosses of the child's head were very prominent and firm. All the cranial diameters were larger than normal, but especially the biparietal.

SUMMARY

In former times, when surgical delivery was necessary, classic Caesarean section was the only recourse, but today there are at least five surgical procedures which have to be considered in making a choice of method of surgical delivery; namely, vaginal hysterotomy, low-incision-transperitoneal hysterotomy, classic Caesarean section, Porro-Caesarean and pubiotomy.

Vaginal hysterotomy has the advantage of avoiding an abdominal incision, the danger of opening the peritoneal cavity and the risk of rupture of the uterine scar in a subsequent pregnancy, but involves great danger to the child and the maternal soft parts.

Classic Caesarean section affords an easier and more rapid method of delivery than does the cervical hysterotomy, either suprapubic or vaginal, but it entails the serious danger of rupture of the scar in a future pregnancy. No case in which the membranes are ruptured and in which there is known or suspected infection is suitable for the classic Caesarean operation. Other unfavorable features of this operation are that it is apt to permit soiling of the peritoneum with liquor amnii (which may be infected) and it is quite frequently followed by adhesions between the uterine scar and the intestines, omentum, or the uterine wall. Also, the rhythmic contractions and involution of the uterus tend to render slack the sutures in the uterine wound, preventing its uninterrupted healing.

The low-incision-transperitoneal hysterotomy, in which the opening in the uterus is confined to the cervix and lower, non-contractile zone of the uterus, effectively isolates the area of operation from the peritoneal cavity, and when the uterine incision is closed it is covered with peritoneal flaps which minimize the danger of involvement of the peritoneal cavity in case the uterine wound is infected. The risk of rupture in future pregnancies is almost entirely eliminated, as proved by the fact that only two cases of rupture have been reported after extensive use of the operation. The idea that it is difficult to perform is probably due to trouble encountered in the extra-peritoneal operations in which the peritoneum was dissected intact from the bladder, instead of exposing the uterus through a transperitoneal incision.

The published experiences of De Lee and Cornell and of King demonstrate the safety of the low operation, even in cases exposed to infection by vaginal examinations, forceps applications, and rupture of membranes, as well as its comparative freedom from rupture and other serious sequelae which the classic Caesarean entails.

The Porro-Caesarean is indicated in badly infected cases, as an emergency operation to control alarming hemorrhage from the uterus, and is often employed to avoid the repetition of pregnancy.

Pubiotomy has a field of usefulness in certain cases of moderate contraction of the pelvis.

From his own experience and the more extensive experience of others it appears to the author that there are few conditions in which the low-incision, transperitoneal hysterotomy would not be preferable to the classic Caesarean.

HUMAN ACTINOMYCOSIS *

By F. W. RINKENBERGER, M. D.

Actinomycosis, as a disease affecting human beings, is either not so rare as has been supposed, or is frequently overlooked or is becoming more common. Less than one hundred years have elapsed since it was first recognized in man. It was first described by Lebert in 1848, but Von Langenbeck had found it in a case of vertebral caries in 1845. Its infectious character was established by Bollinger in 1876, and the name "Actinomyces" was given to the organism or fungus by Harz, to whom it had been submitted. According to Erving, up to December, 1901, only one hundred cases had been reported in America.

The organism is known as the ray fungus from its characteristic growth on culture media, but the dominating characteristic, as found in pus or discharges from sinuses, is the presence of peculiar yellow bodies or so-called sulphur granules. It apparently has a dual nature, existing as a saphrophyte on grains, hay, straw or other materials, becoming a pathogenic organism when it affects animals or man. Many sods are supposed to be particularly badly infected by the saphrophytes, and there are certain cases on record where the disease seemed to be epidemic in certain fields, notably in some reported cases in Seeland and also in certain areas along the St. Lawrence River. According to Stokes there are seven species, but in a recent paper by Colegrove, in the London Lancet, he gives four species. There has been a great deal of confusion in the classification of the organism, and at the present time the conclusions of Boestrum seem to be discredited, while those of Israel and Wolff are the commonly accepted ones today. The organism is fairly easy of cultivation according to some authorities and difficult according to others, owing to the fact of its slow growth and its being overgrown by other bacteria. It is an anaerobe. It is regarded as belonging to the group of streptothrix or cladothrix bacteria. The organism stains readily by the Ziehl-Gabbet or Gram methods, and is positive to the latter. In form there is a central granule, while at parts of the periphery of this granule club-shaped bodies are present, elsewhere filaments are present, and it is from this characteristic that the organism derives its name of ray fungus. The clubs are usually better developed in bovine than human cases.

So far as human infection is concerned, it is more common between the ages of twenty and forty, and men are affected more than twice as commonly as women. No tissue is immune, and all organs may be affected. According to Pusey the most common sites are the head and neck with about 52 per cent, abdomen about 21.6 per cent, and the lungs 13.2 per cent and the balance distributed in various portions of the body. It will thus be seen that the mouth and jaws, with the alimentary tract and the respiratory tract, are the parts most commonly affected. However, in a

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